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## Preface

The present special issue of *Journal of Geophysics* consists of articles based on papers given at the Sixth Workshop on IMS observations in Northern Europe held in Cumberland Lodge, Windsor from 16–20 May 1983.

Some 60 research scientists attended the Workshop and participated in the discussion of two main themes: Reactions of the ionosphere and neutral atmosphere to magnetospheric activity, together with Geomagnetic pulsations: correlated observations from satellites and the ground. For this second topic, it was decided to concentrate on four particular intervals; these intervals were representative of very different magnetospheric conditions and were well supported by a large number of both ground and spacecraft data sets.

*Interval B1 28 November 1977, 00–10 UT.* Co-ordinator: Hugh Gough, University of York, England.

GEOS 1 identified the plasmapause at an L value of approximately 5 on both an outbound and inbound pass during this interval, corresponding to rather quiet magnetic conditions. The wave characteristics of Pi2, Pse, Pc5, Pc4 and Pc3 pulsation events were studied in conjunction with satellite plasma density and composition measurements and models of magnetospheric pulsation generation. Oxygen ions in the plasmatrough made a significant contribution to the calculated eigenperiods (Gough et al., 1984).

*Interval B2, 2–3 April 1978, 23–02 UT.* Co-ordinator: Re-jean Grard, ESA, The Netherlands.

ISEE 1 and 2 and GEOS 1 were in close conjunction during this interval and detected clear wave activity with period of approximately 90 seconds. Estimates of the eigenperiods of the local standing waves from plasma density data suggest that the 90 second wave is a second harmonic oscillation of flux tubes which is in resonance at about  $L=7$ . Polarization analysis shows a change from left handed to right handed on ISEE 1 on its inbound orbit at about 0100 UT at  $L \approx 7$ , whereas GEOS 1, which is earthward of the resonance region during the Pc4 activity, sees right handed polarization (Gardner, 1984).

*Interval B3, 31 August 1978, 04–16 UT.* Co-ordinator Karl-Heinz Glaßmeier, University at Münster, FRG.

This disturbed interval was characterised by many large-amplitude Pc5 packets which appeared to correlate on occasions with substorm onsets (the substorm centred near the

midnight meridian and the Pc5 pulsations occurring in the morning quadrant). On other occasions, Pc5 packets seemed to be triggered by flux transfer events, detected at the magnetopause by ISEE or to coincide with a sudden impulse in the D component of the magnetic field measured at GOES 2 (Glaßmeier et al., 1984).

Several detailed analyses of ground magnetometer data were presented demonstrating the variation of amplitude and phase over the Münster array.

*Interval B4, 5 April 1979, 0130–1600 UT.* Co-ordinator: Udo Wedeken, University at Göttingen, FRG.

This was a highly disturbed period with an ssc at 0156 UT. Pc5 pulsations were associated with this storm sudden commencement and were recorded on numerous instruments on the ground and on GEOS 2. The GEOS 2 data show magnetopause crossings between 0900 and 1000 UT and after the second ssc which occurred at 1225 UT strong Pc5 activity was evident in the period 1200–1600 UT. The periods of the Pc5 pulsations associated with the ssc's were dependent on geomagnetic latitude. The longer periods were at the higher latitudes (Wedeken et al., 1984).

Spectacular Pc2 events (period range 5–12 sec) were detected from 0705 to 1245 UT at different times on the Göttingen array in Scandinavia, the IGS network and the Bell Laboratories magnetometers in North America. For one wave packet the peak to peak amplitude was greater than 10 nT and sonagram analysis showed a rising frequency with time. The overall parameters for this event suggested that an oxygen cyclotron instability was a candidate for the source mechanism (Inhester et al., 1984).

Invited papers were given by Southwood, Orr (1984), and Grard. Ward (1984) presented work on pulsating aurora and ELF intensity levels at geostationary orbit.

This special issue follows basically the order of the Workshop and is evidence of widespread co-operation amongst the scientific community. The Workshop was successful in stimulating collaborative studies between many different groups. All the papers mentioned in this preface, and associated with the date 1984, are included in this issue.

The Journal Editor thanks all the referees for their efforts and support.